

UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

DISTRICT 7

ACCIDENT INVESTIGATION REPORT
(UNDERGROUND COAL MINE)
NON-FATAL COAL OUTBURST ACCIDENT
NO. 37 MINE (I.D. NO. 15-04670)
ARCH OF KENTUCKY, INCORPORATED
CUMBERLAND, HARLAN COUNTY, KENTUCKY

NOVEMBER 22, 1989

BY

DEWEY C. DUNFORD
COAL MINE SAFETY AND HEALTH INSPECTOR

AND

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ORIGINATING OFFICE - MINE SAFETY AND HEALTH ADMINISTRATION
HC 66, BOX 1762, BARBOURVILLE, KENTUCKY 40906
JOSEPH J. GARCIA, DISTRICT MANAGER

REPORT OF INVESTIGATION
(UNDERGROUND COAL MINE)

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Abstract of Investigation

U.S. Department of Labor

Mine Safety and Health Administration

AUTHORITY: This report is based on an investigation made pursuant to the Federal Mine Safety and Health Act of 1977, Public Law 95-173, as amended by Public Law 95-164.

Section A - Identification Data

1. Title of Investigation: Nonfatal Coal Outburst Accident	2. Date MSHA investigation started: 11/22/89
3. Report release date: 12/18/1989	4. Mine: No. 37
5. Mine ID number: 15-04670	6. Company: Arch of Kentucky, Inc.
7. Town, County, State: Cumberland, Harlan County, Kentucky	8. Author(s): Dewey Dunford and James Povnter

Section B - Mine Information

9. Daily production: 14334	10. Surface employment: 59
11. Underground employment: 203	12. Name of coalbed: Harlan
13. Thickness of coalbed: 84 inches	

Section C - Last Quarter Injury Frequency Rate (HSAC) for:

14. Industry:	15. This operation:
16. Training program approved: 5/17/88	17. Mine Profile Rating: N/A

Section D - Originating Office

18. Mine Safety and Health Administration	Address:
Mine Health and Safety District No. : 7	HC 66, Box 1762, Barbourville, Kentucky 40906

Section E - Abstract

A coal outburst accident occurred at 10:45 am, Wednesday, November 22, 1989, on the 004-0 (R-3) Longwall Section, resulting in two employees, Leeman Asher, headgate end shearer operator and Charles D. Creech, tailgate end shearer operator, being injured. As the shearer was making the first of two planned cut-out passes along the tailgate end of the coal face, the outburst occurred. The two operators became separated from the other section employees by coal and debris which had been blown out into the conveyor and travelway of the longwall unit, from shield Number 88 to 96. A search for the two men was begun immediately by Dan Stickel, mine manager, and Don Hendrickson, section foreman, who were located in the general area between the shield Numbers 70 to 79 at the time of the occurrence. The men were soon located, both conscious. Asher had been blown back between the shield support legs of Numbers 92 and 93 shield, receiving a broken arm, some broken ribs, and lacerations to his face and chest. Creech had been knocked down in the travelway at the tailgate area receiving injuries to his face and head. First-aid treatment was administered to them and they were transported to the surface. Creech was transported to the Lynch (Kentucky) Clinic, where he was treated and released. Asher was transported to the Southeast Community College (Cumberland, Kentucky), where he was transported via helicopter (Med-Flight) to the East Tennessee (Knoxville) Baptist Hospital, where he was admitted for medical treatment.

Section F - Mine Organization

Company officials:	Name	Address
19. President:	Tom J. Sawarynski	P.O. Box 787, Lynch, Kentucky 40855
Mine Manager:	Danny L. Stickel	P.O. Box 787, Lynch, Kentucky 40855
Safety Director:	John Dzurino	P.O. Box 787, Lynch, Kentucky 40855
Principle officer - H&S:	Danny L. Stickel	P.O. Box 787, Lynch, Kentucky 40855
23. Labor Organization:	U.M.W.A. District 19, Local 7425	P.O. Box B, Cumberland, Kentucky 40823
24. Chairman - H&S Committee:	George Massey	Box 404, Lynch, Kentucky 40855

GENERAL INFORMATION

The No. 37 Mine of Arch of Kentucky, Incorporated is located one mile south of U.S. 119 on Cloverlick Road, Cumberland, Harlan County, Kentucky. The mine began operation on or about October 1, 1980. The mine produces coal with four shifts per day, five days per week, with two-hundred-thirty-five underground employees and forty-seven surface employees.

The mine is a multi-unit mine with two advancing units and one longwall unit, in production at this time. The advancing units utilize three entry systems with Joy 12CM Continuous Miners, Joy 10SC shuttle cars, Fletcher or Galis roof bolters and S&S scoops. The longwall unit utilizes a Mitsui Trojan 700 shearer, one-hundred-four Gullick-Dobson shields, and a Halbach-Braun stage-loader automatic face conveyor system across a five-hundred foot working face. All units utilize belt conveyor coal haulage. Track haulage is used for mantrip and supply via battery and/or diesel-powered vehicles. The mine has a daily production of ten-thousand tons.

Principal Mine Officials are:

Tom J. Sawarynski
Danny Stickel
Kenneth R. McCoy

President
Mine Manager, No. 37 Mine
Assistant Superintendent
of Operations
Manager of Safety and
Employee Development

John Dzurino

The Roof Control Plan, approved June 20, 1988, provides for overhead support in all roof spans. The maximum entry width is twenty feet, developed with a minimum distance of fifty-five feet between the centers of entries, crosscuts and rooms. Rods, fully grouted with polyester resin are used on advancing sections. The minimum length of rods is thirty-six inches with installation on forty-eight inch centers. Tensioned rebar combination bolts, with twenty-four inches minimum grouting, having a minimum length of forty-eight inches, installed on forty-eight inch centers are also approved for use. The retreating longwall section provides for full overhead support utilizing two-leg hydraulically powered "shields" with three-hundred-ninety-five tons yield capacity per leg. Shields are equipped with extensible plates for skin-to-skin protection on the roof beam and caving shield to provide immediate support behind the shearer. Lexan (bullet-proof glass) had been installed between the panline and the walkway under the shields.

The last regular Health and Safety Inspection was completed September 28, 1989.

DESCRIPTION OF ACCIDENT

On Wednesday, November 22, 1989, at approximately 7:30 a.m., the Mine Manager, Dan Stickel, and the 004 Section crew under the supervision of Don Hendrickson, Section Foreman, entered the mine via diesel powered track mantrip and traveled to the 004 (R-3) Longwall section. The crew switched out on the section with the previous shift's crew. Work assignments were made and the crew began drilling stress detection and destressing holes in the longwall face area. Ten holes, 12 to 18 feet in depth, were drilled between shield Numbers 78 to 97. The holes were then charged with 3 pounds each, of explosives. The crew was removed to the headgate area and the explosives were detonated. The face area was then examined by the foreman and the longwall crew commenced production.

The shearer was located at the headgate and one complete clean-up pass was made to the tailgate. The shearer was then backed up to the Number 67 shield and mining began from the coal face. The shearer was making one of two planned cut-out passes to advance the tailgate end of the longwall face. Charles D. Creech, tailgate end operator and Leeman Asher, headgate end operator, were operating the shearer. At approximately 10:45 a.m., as the shearer advanced to the Number 102 shield, an outburst of coal occurred, injuring both operators.

Immediately after the outburst occurred Hendrickson and Stickel, who were located outby the Number 79 shield, began searching along the longwall conveyor panline and travelway for the two shearer operators, who had been separated from them by blown-out coal and debris. Visibility was greatly impaired by the presence of dust in the air after the outburst occurred. Stickel located Asher behind the Number 92 shield. The concussion of the outburst had forced him back through the opening between the supporting legs of the Numbers 92 and 93 shields. Stickel crawled into the area and began to check Asher as to the extent of his injuries. Hendrickson arrived and relieved Stickel and sent Cecil Foutch, propman, for the first-aid equipment and to telephone to the surface for assistance and an ambulance. Stickel began to make his way toward the tailgate by crawling through the area between the shields' lemniscate links and the support legs to the Numbers 93 through 96 shields. The regular travelway in front of the shields was blocked by the blown out coal and debris.

Foutch went to the headgate area and had another employee telephone to the surface for assistance while he took the first aid equipment to Hendrickson, who had started treating Asher's injuries.

Meanwhile, Stickel had located Creech at the tailgate area. Creech was able to walk, so they attempted to travel the escapeway at the tailgate entry, but it was also blocked by blown-out coal and debris. They traveled back through the same travelway Stickel had used to reach the tailgate area. They arrived at the location where Hendrickson was administering first-aid treatment to Asher. Stickel then assisted Hendrickson in getting Asher out from behind the shield and placed him on a stretcher for transportation. Asher and Creech were then taken to the mantrip car where they were transported to the surface.

A doctor and ambulances had arrived prior to them reaching the surface. Upon examining the two injured men, the doctor had Creech taken to the Lynch Clinic, Lynch, Kentucky, via the Tri-City Ambulance Service. He was treated and released the same day. The doctor had Asher taken to the Southeast Community College, Cumberland, Kentucky, via Parker Funeral Home ambulance where he was then transported via helicopter (Med-Flight) to the East Tennessee Baptist Hospital, Knoxville, Tennessee, where he was admitted for treatment.

PHYSICAL FACTORS INVOLVED

The investigation revealed the following factors relevant to the occurrence of the accident:

1. The mine is located in the Harlan coal-seam, one-half mile south of Cumberland, Harlan County, Kentucky. The immediate roof, throughout the mine, normally consists of ten feet or more siltstone and the main roof consists of ten feet or more sandstone. Coal is extracted from the longwall face by a Mitsui Trojan 700 ripper-type shearer. The coal is transported across the five-hundred foot face by a Halbach-Braun (H&B) conveyor pan-line.
2. The roof is supported across the face by Gullick-Dobson two-leg shields with three-hundred-ninety-five tons per leg yield capacity.
3. Four foot by four foot sheets of Lexan (a bullet-proof plexiglass material) is installed between the travelway and the face conveyor along the longwall system, extending from shield numbers 15 to 99. These sheets were installed to deflect material which might be thrown from the coal face during mining operations or coal outbursts.

4. The headgate and tailgate entries, for the affected panel, were developed as three-entry systems on one-hundred-twenty foot centers. The yield pillars crosscut width driven on seventy-three foot centers and the abutment pillars driven on one-hundred-five foot centers.
5. The total amount of overburden, at the scene of the accident was approximately one-thousand-one-hundred-seventy-five feet.
6. The longwall face was de-stressed by drilling and blasting prior to mining.
7. There was no prior warning or indication that the outburst was about to occur. The only indication that an outburst had occurred was the concussion forces that were felt by the persons in the face area. Stickle, Hendrickson and Foutch were blown down by the forces of the outburst.
8. The Gullick-Dobson two-leg shield supports, Numbers 82 and 104, collapsed as a result of the shock forces from the outburst. The shields collapsed due to the failure of "staple-lock" plug fittings on each of the two supporting legs. The operating pressure of the hydraulic system was four-thousand seven-hundred pounds per square inch (4700 psi) and the yield pressure was approximately five-thousand eight-hundred seventy-five pounds per square inch (5875 psi). The hydraulic cylinder legs had been static-pressure tested by the manufacturer at nine-thousand six-hundred pounds per square inch (9600 psi) with no mechanical damage or failure to the legs' components.
9. The pressure-cap relief system was capable of withstanding a two and three-tenths meters per second (seven and six-tenths feet per second) convergence and a maximum flow rate of one-thousand one-hundred liters per minute (approximately two-hundred ninety gallons per minute).
10. The outburst moved the shearer machine and conveyor pan-line laterally approximately seven feet to the bridge of the shields and the resulting forces severed the connecting bolts in the shearer frame, breaking it in half and fracturing the underlying conveyor pan-line at three locations.
11. Approximately one-hundred forty tons of coal and debris was deposited along the longwall face, from the numbers 80 to 96 shields, by the force of the outburst.

12. In the tailgate entry, two pillars of coal, one measuring approximately fifty-three feet by one-hundred feet and the other measuring approximately eighty-five feet by one-hundred feet failed under the compressive forces and large cavities were observed over the surface of the crushed coal.
13. The tailgate entry was completely blocked by loose coal, cribbing material and debris from a point approximately twenty feet outby the longwall face, at the Number 25 crosscut to a point approximately fifteen feet inby the Number 23 crosscut, a total distance of approximately two-hundred feet.
14. The tailgate end of the longwall coal face showed no indications of stress or failure from the shearer down to the corner, a distance of approximately twelve feet.

CONCLUSION

The accident occurred due to excessive pressure across the tailgate end of the working face, created by a massive consolidated sandstone channel.

VIOLATIONS


There were no violations observed as contributing factors to the accident:

- I. A 103-K Order was issued November 22, 1989, for the purpose of investigation of the accident.
- II. A 107-A Imminent Danger Order was issued November 22, 1989, to assure the safety of persons on the section until the section is deemed safe to work.


Respectfully submitted,


Dewey C. Dunford
Coal Mine Safety & Health Inspector

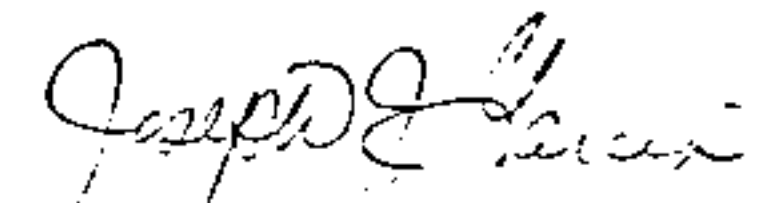
and


James W. Poynter
Coal Mine Safety & Health Inspector

Approved by:


Carl E. Boone, II
Subdistrict Manager

and


Joseph J. Garcia
District Manager

APPENDIX

List of persons furnishing information and/or present during the investigation:

Arch of Kentucky, Incorporated

Kenneth McCoy	Asst. Superintendent of Operations
Dan F. Stickel	Mine Manager
Don Hendrickson	Section Foreman
Rick Damron	Longwall Coordinator
Dickie Estep	Safety Supervisor
John Dzurino	Manager of Safety and Employee Development
George Levo	Engineer

United Mine Workers of America

Kenny Johnson	President, Local 7425
George Massey	Chairman-Health & Safety Committee
Phillip King	Safety Committeeman
Leonard Fleming	District Administrator

Kentucky Department of Mines and Minerals

Dewey Middleton	District Supervisor
Dave Disney	Inspector
Ron Hampton	Inspector
Gary Hall	Safety Analyst

Mine Safety and Health Administration

Kenneth Fee	Supervisor
Robert Blanton	Roof Control Specialist
James Poynter	Coal Mine Inspector
Dewey Dunford	Coal Mine Inspector

Data Sheet

U.S. Department of Labor
Mine Safety and Health Administration

Section A - Victim Data

1. Name	2. Sex	3. Social Security Number
Leeman Asher	<input checked="" type="checkbox"/> Male <input type="checkbox"/> Female	405-56-8749
4. Age	5. Job Classification	
48	Utility	
6. Experience at this Classification	7. Total Mining Experience	
Approximately 6 years	Apprx. 19 years	
8. What activity was being performed at time of accident?	9. Victim's Experience at this Activity	10. Was victim trained in this task?
Headgate Shearer Operator	2 years	Yes

Section B - Victim Data for Health and Safety Courses/Training Received (related to accident)

Date Received

11. Annual Retraining	Sept. 9, 1989
12	
13	
14	

Section C - Supervisor Data (supervisor of victim)

15. Name	16. Certified
Don Hendrickson	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
17. Experience as Supervisor	18. Total Mining Experience
14 years	14 years

Section D - Supervisor Data for Health and Safety Courses/Training Received (related to accident)

Date Received

19. Annual Retraining	Aug. 23, 1989
20. Electrical Retraining	Aug. 24, 1989
21. Mine Rescue	monthly
22	

23. When was the supervisor last present at accident scene prior to the accident?

Present

24. What did he do when he was there?

Observing operations

25. When was he last in contact with the victim?

Approximately 15 minutes

26. Did he issue instructions relative to the accident?

No

Was he aware of or did he express an awareness of any unsafe practice or condition?

NO

Data Sheet

U.S. Department of Labor

Mine Safety and Health Administration

Section A - Victim Data

1. Name

Charles D. Creech

2. Sex

☒ Male ☐ Female

3. Social Security Number

402-84-5840

4. Age

38

5. Job Classification

Tailgate Shearer Operator

6. Experience at this Classification

7 Years

7. Total Mining Experience

15 1/2 Years

8. What activity was being performed at time of accident?

Operating Tailgate Shearer

9. Victim's Experience at this Activity 10. Was victim trained in this task?

7 Years

Yes

Section B - Victim Data for Health and Safety Courses/Training Received (related to accident)

Date Received

11. Annual Retraining

Sept. 9, 1989

12

13

14

Section C - Supervisor Data (supervisor of victim)

15. Name

Don Hendrickson

16. Certified

☒ Yes ☐ No

17. Experience as Supervisor

14 years

18. Total Mining Experience

14 years

Section D - Supervisor Data for Health and Safety Courses/Training Received (related to accident)

Date Received

19. Annual Retraining

Aug. 23, 1989

20. Electrical Retraining

Aug. 24, 1989

21. Mine Rescue

monthly

22

23. When was the supervisor last present at accident scene prior to the accident?

Present

24. What did he do when he was there?

Observing operations

25. When was he last in contact with the victim?

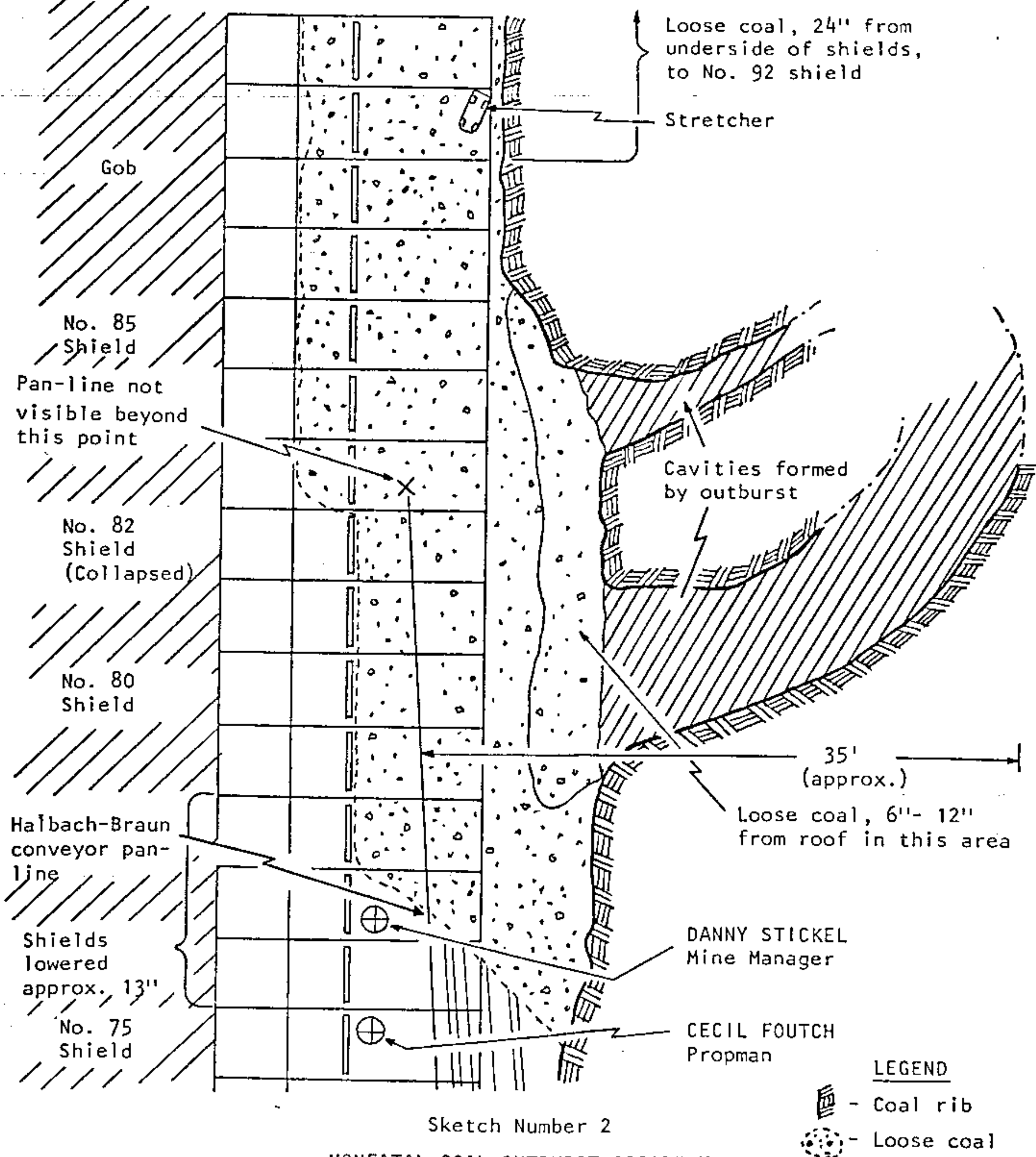
Approximately 15 minutes

26. Did he issue instructions relative to the accident?

No

27. Was he aware of or did he express an awareness of any unsafe practice or condition?

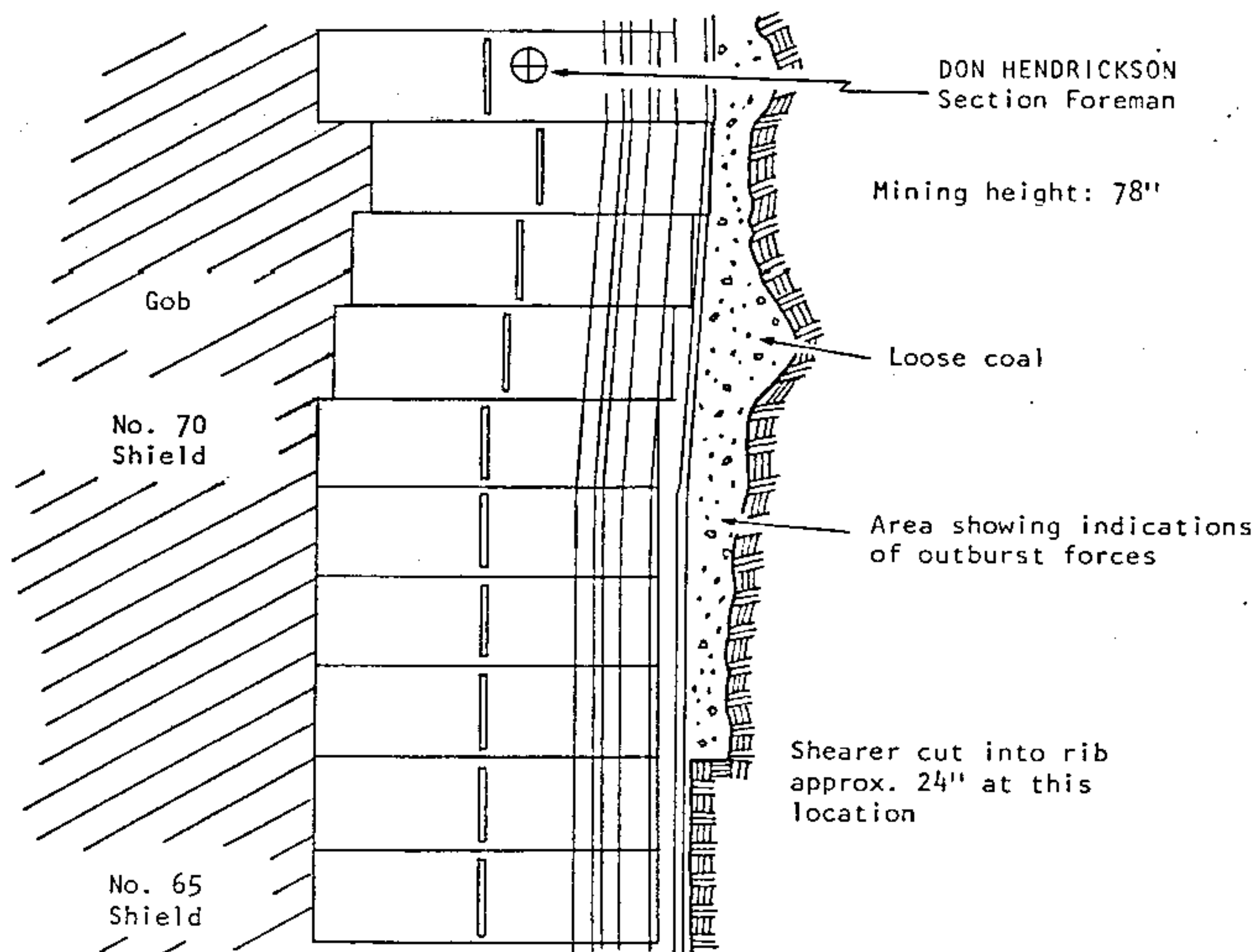
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Sketch Number 2

NONFATAL COAL OUTBURST ACCIDENT
 NO. 37 MINE (I.D. NO. 15-04670)
 ARCH OF KENTUCKY, INCORPORATED
 CUMBERLAND, HARLAN COUNTY, KENTUCKY
 NOVEMBER 22, 1989

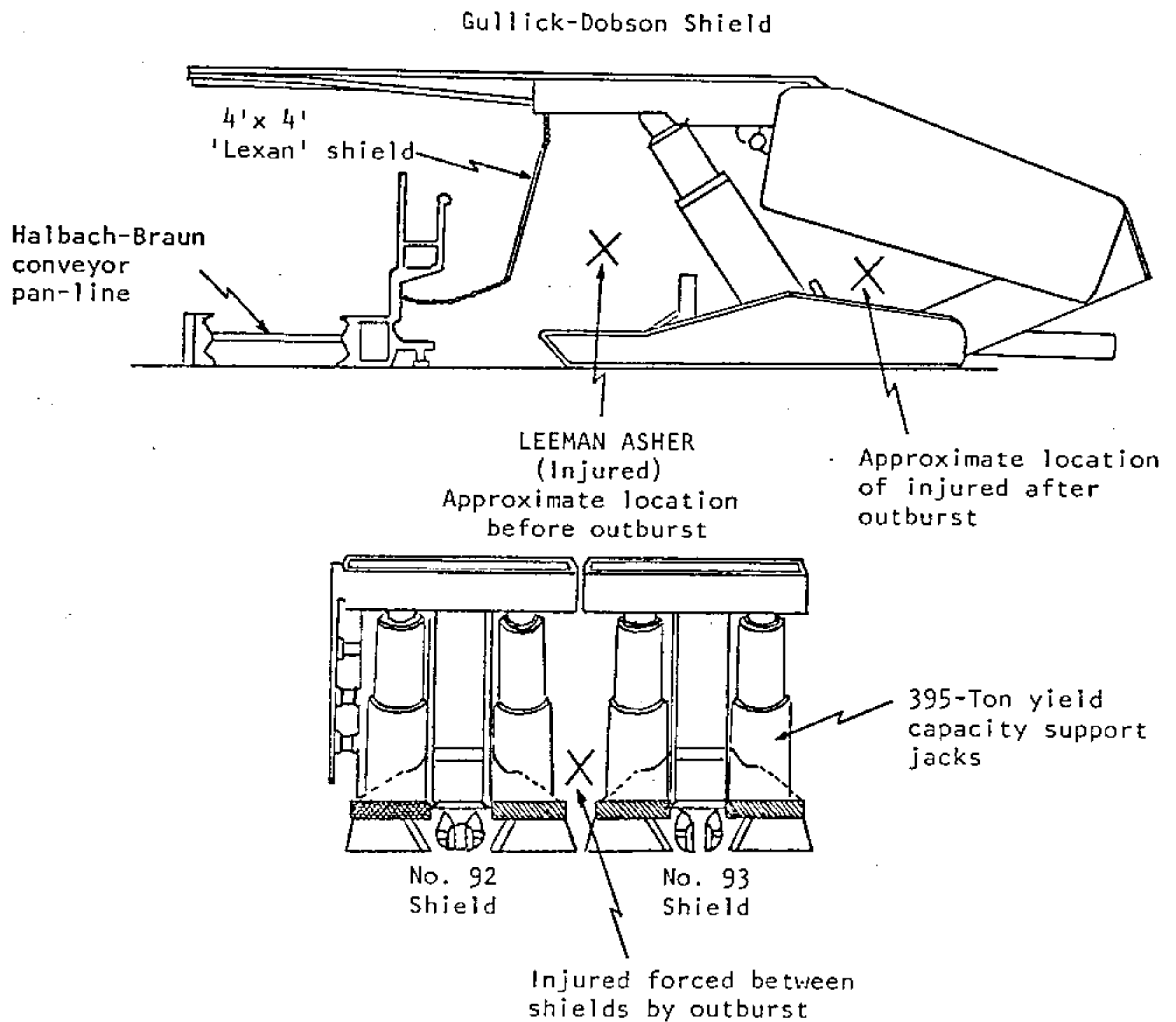
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Sketch Number 3

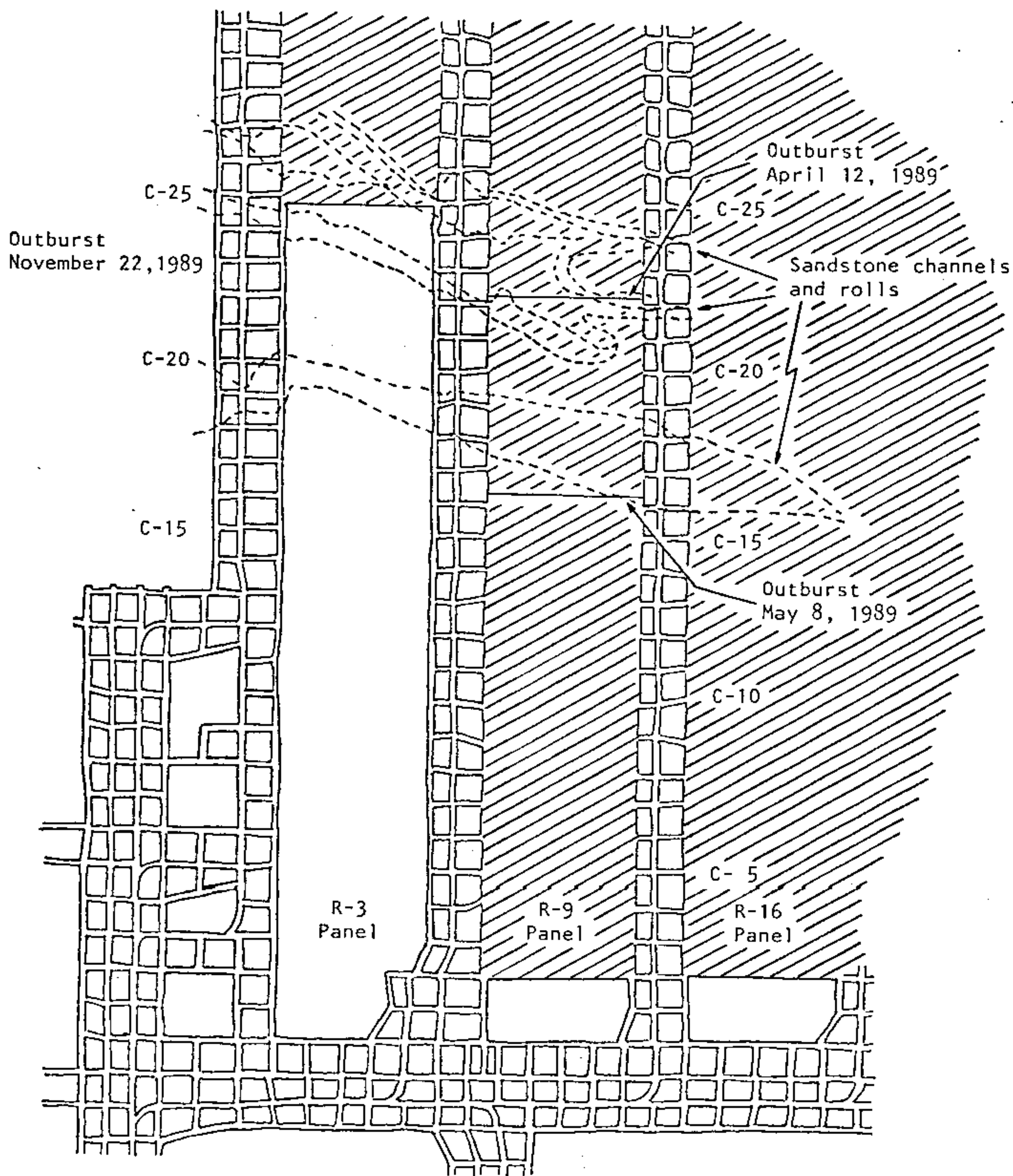
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Scale: 1" = 10'



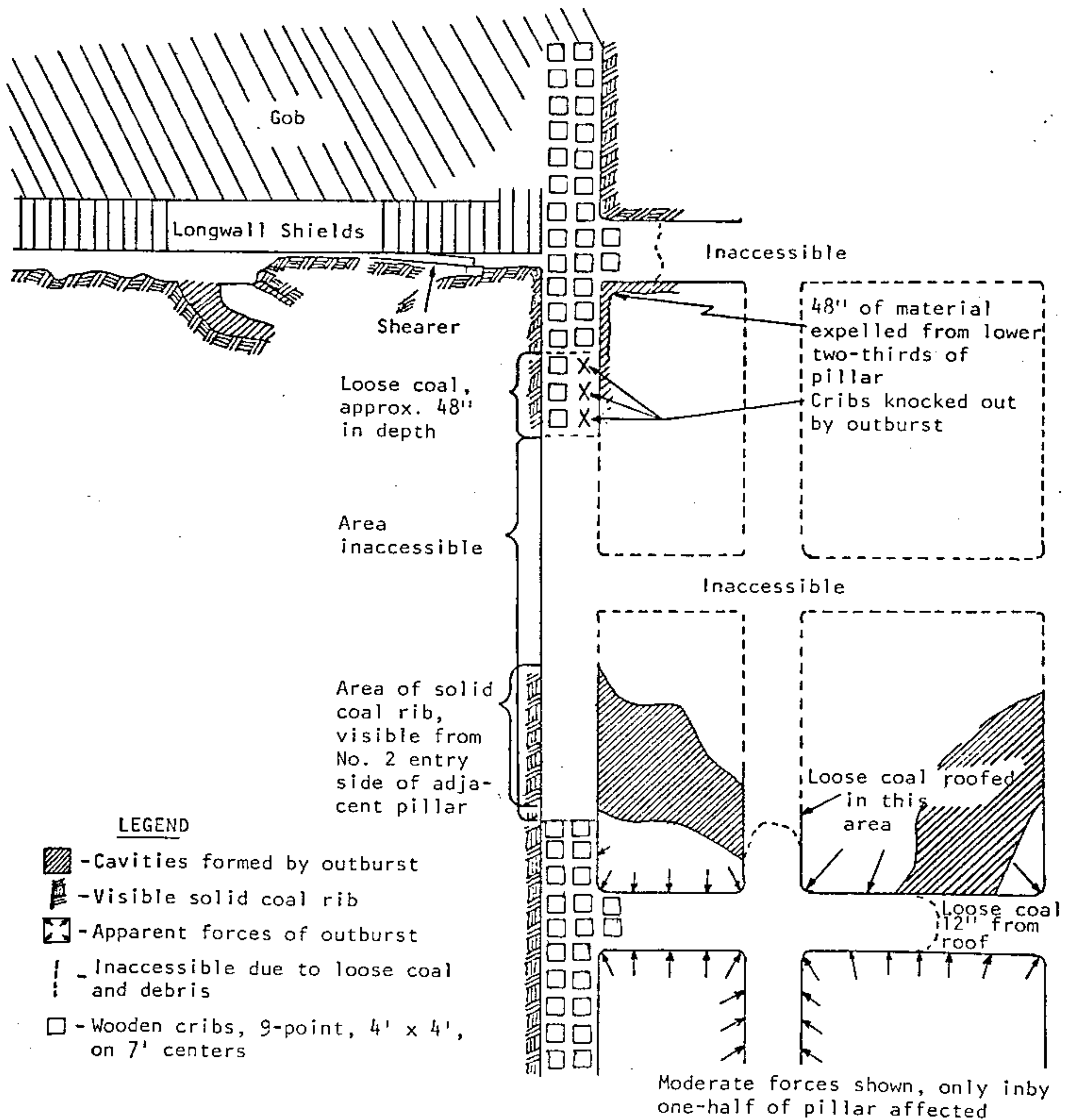
Sketch Number 4

NONFATAL COAL OUTBURST ACCIDENT
NO. 37 MINE (I.D. NO. 15-04670)
ARCH OF KENTUCKY, INCORPORATED
CUMBERLAND, HARLAN COUNTY, KENTUCKY
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Sketch Number 6
 NONFATAL COAL OUTBURST ACCIDENT
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 CUMBERLAND, HARLAN COUNTY, KENTUCKY
 NOVEMBER 22, 1989

Scale: 1" = 500'



Sketch Number 5

NONFATAL COAL OUTBURST ACCIDENT
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 CUMBERLAND, HARLAN COUNTY, KENTUCKY
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